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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/686,116

10/15/2003

Michael D. Casper

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EXAMINER

SCHILLINGER, LAURA M

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Office Action Summary</b></p>	<b>Application No.</b> 10/686,116	<b>Applicant(s)</b> CASPER ET AL.	
	<b>Examiner</b> Laura M Schillinger	<b>Art Unit</b> 2813	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-67 is/are pending in the application.
- 4a) Of the above claim(s) 31-67 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/15/03</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-30, drawn to a method, classified in class 438, subclass 706.
- II. Claims 31-67, drawn to a device, classified in class 257, subclass 533.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the upper electrode may be patterned by CMP or photoresist techniques.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II and vice versa, restriction for examination purposes as indicated is proper.

This application contains claims directed to the following patentably distinct species of the claimed invention:

Group II:

Species 1, claims 31-61, pertaining to a device consisting of a capacitor/inductor or interconnect;

Species 2, claims 62-67, pertaining to a phased antenna array.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, there is no generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

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During a telephone conversation with Kevin Klughart on 11/17/04 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-30. Affirmation of this election must be made by applicant in replying to this Office action. Claims 31-67 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor ('323).

Taylor teaches or renders obvious the following claimed limitations as recited below:

1. A thin film capacitor/inductor/interconnect method comprising:
  - (1) thinly metalizing a substrate with a lower electrode and interconnect layer formed on said thin film hybrid substrate, said layer further comprising a lower adhesive layer and an upper conducting layer having a sum total thickness of less than or equal to 1.95 microns (Col.1, lines: 45-50);

- (2) applying/imaging photoresist and etching to form metal patterns on said substrate for lower capacitor electrodes and interconnect (Fig. 1D (24) (Col. 1-2, lines: 65-5);
  - (3) applying a thin dielectric layer to said metal patterns (Fig. 1A (16) and Col. 1, lines: 50-55);
  - (4) applying/imaging photoresist and etching to form contact holes in said dielectric layer and optionally selectively patterning said layer; (Col. 1, lines: 55-60)
  - (5) metalizing said substrate to make contact with said lower capacitor electrodes and interconnect (Col. 1, lines: 50-55);
  - (6) applying/imaging photoresist and etching to form patterns for upper capacitor electrodes, inductors, and/or interconnect conductors (Col. 2, lines: 5-10);
  - (7) optionally resistor elements by applying/imaging photoresist and etching a resistor layer on said substrate;
- forming wherein said upper conducting layer is approximately 0.5 microns thick (Col. 2, lines: 10-15).

However, Taylor fails to teach wherein the thickness of the first layer is 1.5 microns or less, nor does Taylor explicitly teach wherein the upper conducting layer is 0.25 microns thick as claimed by the Applicant. However such thickness are considered an obvious variation because as Taylor teaches, thickness and composition of electrode materials can vary from those specified without substantially altering the invention (Col. 4, lines: 60-68). Moreover, these claim limitations are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result

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effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA 1985) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and *In re Aller*, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

2. The thin film hybrid substrate method Claim 1, wherein said lower adhesive layer is approximately 0.2 microns thick (Col.1, lines: 49-50). However, Taylor fails to teach wherein the adhesive is 0.03 to 0.05 um thick as claimed by the Applicant.

However such thickness are considered an obvious variation because as Taylor teaches, thickness and composition of electrode materials can vary from those specified without substantially altering the invention (Col.4, lines: 60-68). Moreover, these claim limitations are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA 1985) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and *In re Aller*, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

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3. The thin film hybrid substrate method Claim 1, wherein said lower adhesive layer comprises chrome (Abs., lines: 1-5).

4. The thin film hybrid substrate method of Claim 1, wherein said lower adhesive layer comprises titanium (Col.1, lines: 49-50).

5. The thin film hybrid substrate method of Claim 1, wherein said lower adhesive layer comprises titanium- tungsten (Col.1, lines: 49-50).

6. The thin film hybrid substrate method of Claim wherein said upper conducting layer comprises silver (Abs., lines: 1-10).

7. The thin film hybrid substrate method of Claim 1, wherein said upper conducting layer comprises aluminum (Col.2, lines: 10-15).

8. The thin film hybrid substrate method of Claim 1, wherein said upper conducting layer comprises gold (Col.2, lines: 10-15).

9. The thin film hybrid substrate method of Claim 1, wherein said upper conducting layer comprises copper (Abs., lines: 1-10).

10. The thin film hybrid substrate method of Claim 1, wherein said lower electrode and interconnect layer further comprises silver (Abs., lines: 1-10).



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11. The thin film hybrid substrate method Claim 1, wherein said lower electrode and interconnect layer further comprises aluminum (Col.2, lines: 10-15).
12. The thin film hybrid substrate method of Claim 1, wherein said lower electrode and interconnect layer further comprises gold (Col.2, lines: 10-15).
13. The thin film hybrid substrate method of Claim 1, wherein said lower electrode and interconnect layer further comprises copper (Abs., lines: 1-10).
14. The thin film hybrid substrate method of Claim wherein said lower electrode and interconnect layer is selected from the group consisting of tantalum, molybdenum, platinum, tungsten, titanium, nickel, palladium, and chromium (Col.1, lines: 45-50).
15. The thin film hybrid substrate method of Claim wherein said dielectric layer is selectively patterned (Col.1, lines: 58-63).
16. The thin film hybrid substrate method of Claim wherein said dielectric layer further comprises silicon nitride (Abs., lines: 1-10).
17. The thin film hybrid substrate method of Claim wherein said dielectric layer further comprises silicon dioxide (Abs., lines: 1-10).
18. The thin film hybrid substrate method Claim wherein said dielectric layer further comprises silicon oxynitride (abs., lines: 1-10).
19. The thin film hybrid substrate method of Claim wherein said dielectric layer further comprises aluminum oxide (abs., lines: 1-10).

Taylor teaches to use a ferroelectric dielectric material the following claims are determined to be obvious because they recite compositions of well-known ferroelectric materials:

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20. The thin film hybrid substrate method of Claim wherein said dielectric layer further comprises tantalum pentoxide (Col.1, lines: 10-20).

21. The thin film hybrid substrate method of Claim wherein said dielectric layer further comprises a ferroelectric material (abs., lines: 1-10).

22. The thin film hybrid substrate method of Claim 21, wherein said ferroelectric material is  $\text{BaTiO}_3$  (Col.1, lines: 10-20)

23. The thin film hybrid substrate method of Claim 21, wherein said ferroelectric material is  $\text{SrTiO}_3$  (Col.1, lines: 10-20).

24. The thin film hybrid substrate method of Claim 21, wherein said ferroelectric material is  $\text{PbZrO}_3$  (Col.1, lines: 10-20).

25. The thin film hybrid substrate method of Claim wherein said ferroelectric material is PTO (Col.1, lines: 10-20). 26. The thin film hybrid substrate method of Claim 21, wherein said ferroelectric material is LNO (Col.1, lines: 10-20).

27. The thin film hybrid substrate method of Claim wherein said ferroelectric material is BTO (Col.1, lines: 10-20).

28. The thin film hybrid substrate method of Claim wherein said dielectric layer further comprises polyimide (Col.1, lines: 10-20).

29. The thin film hybrid substrate method of Claim wherein said dielectric layer further comprises benzocyclobutene (Col.1, lines:10-20) .

30. The thin film hybrid substrate method of Claim wherein said substrate material is selected from the group consisting alumina, beryllium oxide, fused silica, aluminum nitride, sapphire, ferrite, diamond, LTCC, and glass (Col.1, lines: 45-50).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M Schillinger whose telephone number is (571) 272-1697. The examiner can normally be reached on M-T, R-F 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Laura M Schillinger", with a long, sweeping horizontal stroke at the end.

LMS

11/27/04